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### Amendments to the Claims

Claim 1 **(Currently Amended)** A method of fabricating a photonic crystal, comprising ~~the step of~~ forming the photonic crystal directly on an end surface of at least one optical fiber as a substrate.

Claim 2 **(Currently Amended)** The photonic crystal fabricating method according to claim 1, wherein

~~said the forming step includes the steps of~~ operation comprises:

tying a plurality of optical fibers in bundle with each end surface aligned on a same plane to form an optical fiber bundle; and

growing the photonic crystal directly on an end surface of ~~said the~~ optical fiber bundle formed by the end surfaces of the optical fibers aligned on the same plane as the substrate,

wherein by separating ~~said the~~ optical fiber bundle into the optical fibers, the photonic crystal formed on ~~said each the~~ end surface of the optical ~~fibers~~ fiber is obtained.

Claim 3 **(Currently Amended)** The photonic crystal fabricating method according to claim 1, further comprising ~~the steps of:~~

processing the end surface of the optical fiber so that the end surface forms a predetermined angle with an optical axis of the optical fiber, ~~and~~

wherein said forming operation comprises growing the photonic crystal directly on ~~said the~~ processed end surface as the substrate in a direction normal to the end surface.

Claim 4 **(Currently Amended)** The photonic crystal fabricating method according to claim 1, wherein

said forming operation comprises growing the photonic crystal ~~is grown on said the~~ substrate by periodically multilayering particles having a refractive index higher than air on ~~said the~~ substrate in a direction normal to ~~said the~~ substrate.

Claim 5 **(Currently Amended)** The photonic crystal fabricating method according to claim 1, wherein

said forming operation comprises forming a pattern ~~is formed on said the~~ substrate for arbitrarily arranging particles having a refractive index higher than air on ~~said the~~ substrate.

Claim 6 **(Canceled)**

Claim 7 **(Currently Amended)** A method of fabricating a ~~The photonic crystal fabricating method according to claim 6, comprising the steps of:~~

forming, in a predetermined section along an optical axis of an optical fiber having a core adapted to have light propagate therethrough and a clad surrounding the core, at least one pair of planes parallel to the optical axis by partially removing said the clad in said the predetermined section from said the optical fiber toward the core to form at least one plane parallel to said optical axis; and

forming, perpendicularly perpendicular to said plane the pair of planes formed in said removing step forming operation, a plurality of holes penetrating said the core.

Claim 8 **(Currently Amended)** An optical transmission member for transmitting light having a predetermined wavelength, the optical transmission member comprising:

an optical fiber for transmitting the light inputted at one end surface thereof to another end surface thereof for output; and

a photonic crystal layer formed on at least ~~either~~ one of the one end-surfaces surface and the another end surface of said optical fiber, said photonic crystal layer adapted and functioning as a linear polarizer for the light having ~~said the~~ wavelength.

Claim 9 **(Currently Amended)** An optical transmission member for transmitting light having a predetermined wavelength, the optical transmission member comprising:

an optical fiber for transmitting the light inputted at one end surface thereof to another end surface thereof for output; and

a photonic crystal layer formed on at least ~~either~~ one of the one end surfaces surface and the another end surface of said optical fiber, said photonic crystal layer adapted and functioning as a  $\lambda/4$  plate for the light having ~~said the~~ wavelength.

Claim 10 **(Currently Amended)** An optical transmission member for transmitting light having a predetermined wavelength, the optical transmission member comprising:

an optical fiber for transmitting the light inputted at one end surface thereof to another end surface thereof for output; and

a at least one photonic crystal layer formed on at least ~~either~~ one of the one end surfaces surface and the another end surface of said optical fiber, said photonic crystal layer adapted and functioning as a photonic-crystal circular polarizer for the light having ~~said the~~ wavelength.

Claim 11 **(Currently Amended)** The optical transmission member according to claim 10, wherein

~~said at least one photonic crystal~~ photonic crystal layer-circular polarizer includes:

a first photonic crystal layer ~~functioning adapted~~ as a polarizer for converting unpolarized light of ~~said the~~ wavelength into linearly polarized light; and

a second photonic crystal layer ~~functioning adapted~~ as a  $\lambda/4$  plate for converting the linearly polarized light of ~~said the~~ wavelength obtained through said first photonic crystal layer into circularly polarized light.

Claim 12 **(Currently Amended)** The optical transmission member according to claim 10, wherein

~~said photonic crystal circular polarizer is formed as~~ at least one photonic crystal layer is a plurality of photonic crystal layers having a periodic structure ~~in which~~ with a high magnetic permeability ~~portion~~ portion having first magnetic permeability and a low

magnetic permeability portion having second magnetic permeability lower than the first magnetic permeability.

Claim 13 **(Currently Amended)** An optical device ~~structured by forming a photonic crystal on~~ comprising:

an optical fiber ~~composed of having a core through which~~ adapted to have light propagate therethrough and a clad surrounding ~~said the core, comprising:~~ wherein a portion of said clad in a predetermined section of said optical fiber has been removed from said optical fiber toward said core to form at least one pair of planes parallel to an optical axis of said optical fiber, said optical fiber having:

at least one functional part, formed as a said photonic crystal, having with a plurality of columns penetrating through said core in and being perpendicular to said pair of planes ~~predetermined section of said optical fiber along an optical axis of said optical fiber;~~ and

a propagation part for propagating the light as a function of said optical fiber.

Claim 14 **(Currently Amended)** The optical device according to claim 13, wherein

~~said functional part is formed by the~~ plurality of columns are parallel to each other and periodically distributed on a plane perpendicular to a longitudinal direction of said plurality columns.

Claim 15 **(Currently Amended)** The optical device according to claim 13, wherein

~~said plurality of columns forming said functional part~~ penetrate through said core and said clad of said optical fiber.

Claim 16 **(Currently Amended)** The optical device according to claim 13, wherein

| said plurality of columns ~~forming said functional part~~ have a refractive index different from a refractive index of material forming said core.

Claim 17 **(Currently Amended)** The optical device according to claim 16, wherein

| at least a ~~all or~~ part of said plurality of columns ~~forming said functional part~~ is a hole.

Claim 18 **(Currently Amended)** The optical device according to claim 16, wherein

| at least a ~~all or~~ part of said plurality of columns ~~forming said functional part~~ is made of material having a Faraday effect.

Claim 19 **(Original)** The optical device according to claim 18, further comprising a magnetic field generator for applying a magnetic field to said functional part.

Claim 20 **(Currently Amended)** The optical device according to claim 16, wherein

| at least a ~~all or~~ part of said plurality of columns ~~forming said functional part~~ is made of material having an electro-optic effect.

Claim 21 **(Currently Amended)** The optical device according to claim 20, further comprising a plurality of electrodes for applying an electric field to said functional part.

Claim 22 **(Original)** The optical device according to claim 21, wherein said electrodes are provided on a surface formed by partially removing said clad.

Claim 23 **(Currently Amended)** The optical device according to claim 22, wherein

said electrodes are ~~a provided in a pair of electrodes located~~ on a surface perpendicular to a longitudinal direction of said plurality of columns forming said functional part.

Claim 24 **(Currently Amended)** The optical device according to claim ~~23~~ 22, wherein

said electrodes are ~~provided in a pair of electrodes located~~ on two surfaces parallel and opposed to each other with said functional part therebetween, ~~and said pair of electrodes also being perpendicular to the~~ a longitudinal direction of said plurality of columns forming said functional part.

Claim 25 **(Currently Amended)** The optical device according to claim 22, wherein

said electrodes are ~~provided in a pair of electrodes~~ on two surfaces parallel and opposed to each other with said functional part therebetween, ~~and said pair of electrodes also being parallel to said the~~ optical axis and ~~the~~ a longitudinal direction of said plurality of columns forming said functional part.

Claim 26 **(Currently Amended)** The optical device according to claim 21, wherein

said electrodes are arranged to apply ~~said the~~ electric field to said functional part in a direction parallel to the optical axis of said optical fiber.

Claim 27 **(Currently Amended)** The optical device according to claim 21, wherein

said electrodes are arranged to apply ~~said the~~ electric field to said functional part perpendicularly to a longitudinal direction of said plurality of columns forming said functional part and the optical axis of said optical fiber.

Claim 28 **(Currently Amended)** The optical device according to claim 21, wherein

said electrodes are arranged to apply the electric field to form a predetermined angle with a longitudinal direction of said plurality of columns along a plane perpendicular to ~~said~~ the optical axis.

Claim 29 **(Currently Amended)** The optical device according to claim 13, wherein

said functional part is ~~plurally~~ a plurality of functional parts provided along the optical axis of said optical fiber at predetermined intervals.

Claim 30 **(Currently Amended)** The optical device according to claim 29, wherein

said functional part includes

said plurality of columns of a first functional part of said plurality of functional parts ~~are composed of a plurality of columns~~ parallel to each other and periodically distributed on a plane perpendicular to a longitudinal direction of ~~the~~ said columns, and said plurality of columns are made of a Faraday crystal having a refractive index different from a refractive index of material forming said core, ~~and~~

said plurality of columns of a second functional part of said plurality of functional parts ~~are composed of a plurality of holes~~ parallel to each other and distributed on a plane perpendicular to a longitudinal direction of ~~the~~ said holes, and

the longitudinal direction of said plurality of columns ~~forming of~~ of said first functional part forms an angle of 45° with the longitudinal direction of said holes ~~forming of~~ of said second functional part along a plane perpendicular to ~~said~~ the optical axis.

Claim 31 **(Currently Amended)** The optical device according to claim 29, wherein

said functional part includes



said plurality of columns of a first functional part of said plurality of functional parts ~~are composed of a plurality of columns~~ parallel to each other and periodically distributed on a plane perpendicular to a longitudinal direction of ~~the said plurality of columns, and~~ said plurality of columns are made of an electro-optic crystal having a refractive index different from a refractive index of material forming said core;  
and

said plurality of columns of a second functional part of said plurality of functional parts ~~are composed of a plurality of first holes~~ parallel to each other and distributed on a plane perpendicular to a longitudinal direction of ~~the said~~ first holes, and

the longitudinal direction of said plurality of columns ~~forming of~~ said first functional part is perpendicular or parallel to the longitudinal direction of said first holes ~~forming of~~ said second functional part along a plane perpendicular to ~~said the~~ optical axis.

Claim 32 **(Currently Amended)** The optical device according to claim 31, wherein

said plurality of columns of said functional part ~~further comprises a third functional part of said plurality of functional parts are composed of a plurality of second holes~~ parallel to each other and periodically distributed on a plane in a longitudinal direction of ~~the said~~ second holes, and

the longitudinal direction of said plurality of columns ~~forming of~~ said first functional part is perpendicular or parallel to the longitudinal direction of said second holes ~~forming of~~ said third functional part along the plane perpendicular to ~~said the~~ optical axis.

Claim 33 **(Currently Amended)** The optical device according to claim 13, wherein

said functional part has ~~is formed as a photonic crystal with~~ a predetermined refractive index and state of distribution; to have a wavelength dispersion characteristic of recovering a waveform of the light to be a steep waveform for output, the light being

spread by a wavelength dispersion characteristic unique to an optical fiber through which the light passed before being inputted to said optical fiber.

Claim 34 **(Currently Amended)** The optical device according to claim 13, further comprising a guide for surrounding said optical fiber, wherein

said guide is cylindrically shaped ~~having~~ and has a diameter approximately equal to a diameter of a ferrule of another optical fiber connected to said optical fiber.

Claim 35 **(Currently Amended)** An optical device, comprising:

~~a first and second~~ optical fiber having a core and fibers formed by a plurality of holes parallel to each other penetrating through ~~said the~~ core in a predetermined section along an optical axis and periodically distributed on a plane perpendicular to a longitudinal direction of ~~said the~~ holes;

a second optical fiber having a core and a plurality of holes parallel to each other penetrating through said core in a predetermined section along an optical axis and periodically distributed on a plane perpendicular to a longitudinal direction of said holes;

a Faraday device placed to be closely attached between said first and second optical fibers; and

a guide for mechanically adjusting ~~the an~~ optical axis of said first optical fiber and ~~the an~~ optical axis of said second optical fiber, wherein

the a longitudinal direction of said holes of said first optical fiber forms an angle of 45° with ~~the a~~ longitudinal direction of said holes of said second optical fiber along a plane perpendicular to ~~the said~~ optical axis.

**Claims 36-53 (Canceled)**